

Application No.:
Amendment Dated September 18, 2003
Preliminary Amendment

Attorney Docket No.: FUK-12CPA

AMENDMENTS TO THE SPECIFICATION

Migaku TAKAHASHI

MAGNETIC THIN FILM AND PRODUCTION METHOD THEREFOR

CONTINUATION DATA

This is a continuation of U.S. Patent Application No.
09/268,948, filed on March 16, 1999, which is a divisional of
Patent Application No. 08/765,836 filed on January 14, 1997, the
disclosure of each of which is herein explicitly incorporated by
reference.

AMENDMENTS TO THE SPECIFICATION

That is to say, the magnetic thin film of the present invention is ~~characterized in comprising~~ composed of an iron nitride thin film which is formed on a substrate by means of an opposed-target DC sputtering method employing reactive sputtering with N₂ gas.

Furthermore, the magnetic thin film manufacturing method in accordance with the present invention is a manufacturing method for iron nitride thin films which employs an opposed-target DC sputtering method, characterized in that an iron nitride thin film is formed on a substrate by introducing Ar and N₂ gases into a film formation chamber, and applying DC power to an iron target within the Ar and N₂ gas atmosphere.

AMENDMENTS TO THE SPECIFICATION

Furthermore, it is preferable that the ~~election~~ electron ~~temperature~~ voltage during formation of the iron nitride thin film be within a range of 0.01 - eV, and that the electron density be within a range of 1×10^9 - $1 \times 10^{10} \text{ cm}^{-3}$.

By means of the present invention, it is possible to rapidly and stably form an iron nitride thin film having an extremely large saturation M_s , by means of employing an opposed-target DC sputtering method. Additionally, by means of setting the electron ~~temperature~~ voltage and electron density during film formation to within ranges of, respectively, 0.01 - 1 eV and 1×10^9 - $1 \times 10^{10} \text{ cm}^{-3}$, within a chamber, and was then allowed to cool to room temperature.

Application No.:
Amendment Dated September 18, 2003
Preliminary Amendment

Attorney Docket No.: FUK-12CPA

AMENDMENTS TO THE SPECIFICATION

First, an iron base layer having a thickness of 50Å was formed in a Ar atmosphere (at a film formation rate of 33Å/min), and on this, an iron nitride thin film having a thickness of 3000Å was formed in a Ar and N₂ gas atmosphere, at a film formation rate of 200Å/min. Film formation was conducted under conditions such that the electron ~~temperature~~ voltage was equal to 0.3 eV and the electron density Ne was equal to $1 \times 10^{10} \text{ cm}^{-3}$; these were determined on the basis of plasma diagnostic results.